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AERIAL PHOTOGRAPHIC ANALYSIS OF LACLEDE GAS

St. Louis, Missouri

by

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NOTICE

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ABSTRACT

This report presents a historical aerial photographic analysis of the Laclede Gas site in St. Louis, Missouri. Nine selected dates of photography from 1941 to 1988 have been chosen for the analysis. There are eight years of black and white and one year (1988) of color infrared photography represented.

The 1941 photography reveals the site as generally flat, situated on top of a high banked area adjoining the Mississippi River. An electric power plant and coal gasification facility have been located in the northwest portion of the site. Three large inflated gasometers are visible to the immediate north of the coal gasification facility. A suspected burial pit, fill area, and liquid stain have been observed in the southern and eastern portions of the site. The 1953, 1958, and 1968 photography shows the dismantling and removal of the coal gasification facility, the three gasometers, and several vertical tanks.

The 1971 photography divulges the emplacement of five vertical petroleum storage tanks. No significant modifications to the site have been observed on the 1974 photography. The 1980 photography reveals the placement of a commercial loading dock and an overhead pipeline extending from the dock into the eastside of the site. A probable liquid stain was observed at the convergence of piping that interconnects the petroleum storage tanks. No significant changes were observed on the 1984 photography. The 1988 color infrared photography revealed zones of vegetation stress on and adjacent to the site.

The U.S. Environmental Protection Agency's Environmental Monitoring Systems Laboratory in Las Vegas, Nevada prepared this report for the Agency's Waste Management Division in Region 7 at Kansas City, Kansas and the Office of Emergency and Remedial Response in Washington D.C.

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Figure 1. Study area location map, Missouri. Scale 1:2,500,000.

INTRODUCTION

This report presents a historical aerial photographic analysis of the Laclede Gas site in St. Louis, Missouri (Figures 1 & 2). The site is located west of and adjacent to the Mississippi River, approximately 1 mile north of the St. Louis Arch and 1.5 miles south of the McKinley Bridge. Arbitrary boundary lines were placed to enclose the Mound Street Power Plant, Apex Oil Company tank farm, a Coal Gasification facility, and related features. In total, approximately 15 acres have been bounded for the analysis.

Site analysis has been conducted in an attempt to ascertain and identify sources and pathways of potential hazardous material releases. Nine selected dates of photography spanning 1941 to 1988 have been selected for the analysis.

The U.S. Environmental Protection Agency's Environmental Monitoring Systems Laboratory in Las Vegas, Nevada prepared this report for the Agency's Waste Management Division in Region 7 at Kansas City, Kansas and the Office of Emergency and Remedial Response in Washington D.C.

METHODOLOGY

Stereoscopic pairs of historical aerial photographs were used to perform the analysis. Stereo viewing enhances the interpretation because it allows the analyst to observe the vertical as well as horizontal spatial relationships of natural and cultural features. Stereoscopy is also an aid in distinguishing between various shapes, tones, textures, and colors that can be found within the study area.

Evidence of waste burial is a prime consideration when conducting a hazardous waste site analysis. Leachate or seepage resulting from burial and dumping of hazardous materials might threaten existing surface or ground-water resources. Pools of unexplained liquid are routinely noted because they can indicate seepage from buried wastes and may enter drainage channels that allow contaminants to move off the site. An excellent indicator of how well hazardous materials are being handled at a site is the presence or absence of spills, spill stains, and vegetation damage. Trees and other forms of vegetation that exhibit a marked color difference from surrounding members of the same species are labeled "stressed", "damaged," or "dead" based upon the degree of noticeable variation. Vegetation is so labeled only after consideration of the season in which the photography was acquired.

Drainage analysis identifies the direction a spill or surface runoff would follow. Direction of drainage is determined from analysis of the photographs and from U.S. Geological Survey topographic maps. Whenever they are available, 7.5-minute quadrangle maps (scale 1:24,000) are used to show site location and to provide geographic and topographic information. The site boundaries as depicted on maps and photos within the report were selected by the analyst, and are not intended to be used as legal boundaries.

The U.S. Environmental Protection Agency's Statement of Procedures on Floodplain Management and Wetlands Protection (Executive Orders 11988 and 11990, respectively) requires EPA to determine if removal or remedial actions at hazardous waste sites will affect wetlands or flood plains and to avoid or minimize adverse impacts on those areas. To aid in compliance with these orders, significant wetland areas

located within and adjacent to the site have been identified when present. However, these sites have not been visited to verify the accuracy of wetland identification.

Results of the analysis are shown on annotated overlays attached to the photos. The following table provides documentation of the photographs used in this report:

TABLE 1. DOCUMENTATION OF AERIAL PHOTOGRAPHY

Site name, location, geographic coordinates, and SSID#	Figures	Date of acquisition	Original scale	Film type*	Photo source†	Photo I.D.	Frames
Laclede Gas	3	07-17-41	1:20,000	B&W	NARS	TQ	89
St. Louis, Missouri	4	09-08-53	1:20,000	B&W	ASCS	TQ	35
	5	05-13-58	1:20,000	B&W	ASCS	TQ	34
	6	03-03-68	1:24,000	B&W	EROS	VBZG	287
38°38'34"N	7	08-26-71	1:20,000	B&W	ASCS	TQ	28
090°10'58"W	8	07-30-74	1:30,000	B&W	EROS	VDMT	126
	9	12-14-80	1:24,000	B&W	EROS	NHAP_83	207
SSID # MO-ZZ	10	02-21-84	1:24,000	B&W	EROS	NHAP_83	208
	11	04-07-88	1:40,000	CIR	EROS	NAPP	122

*Film type identification:

B&W: Black-and-white
CIR: Color Infrared

†Photo source identification:

EROS: U.S. Department of the Interior, Geological Survey, Earth Resources Observation Systems Data Center, Sioux Falls, South Dakota

ASCS: U.S. Department of Agriculture, Agricultural Stabilization and Conservation Service, Salt Lake City, Utah

NARS: National Archives and Records Administration, Washington D.C.

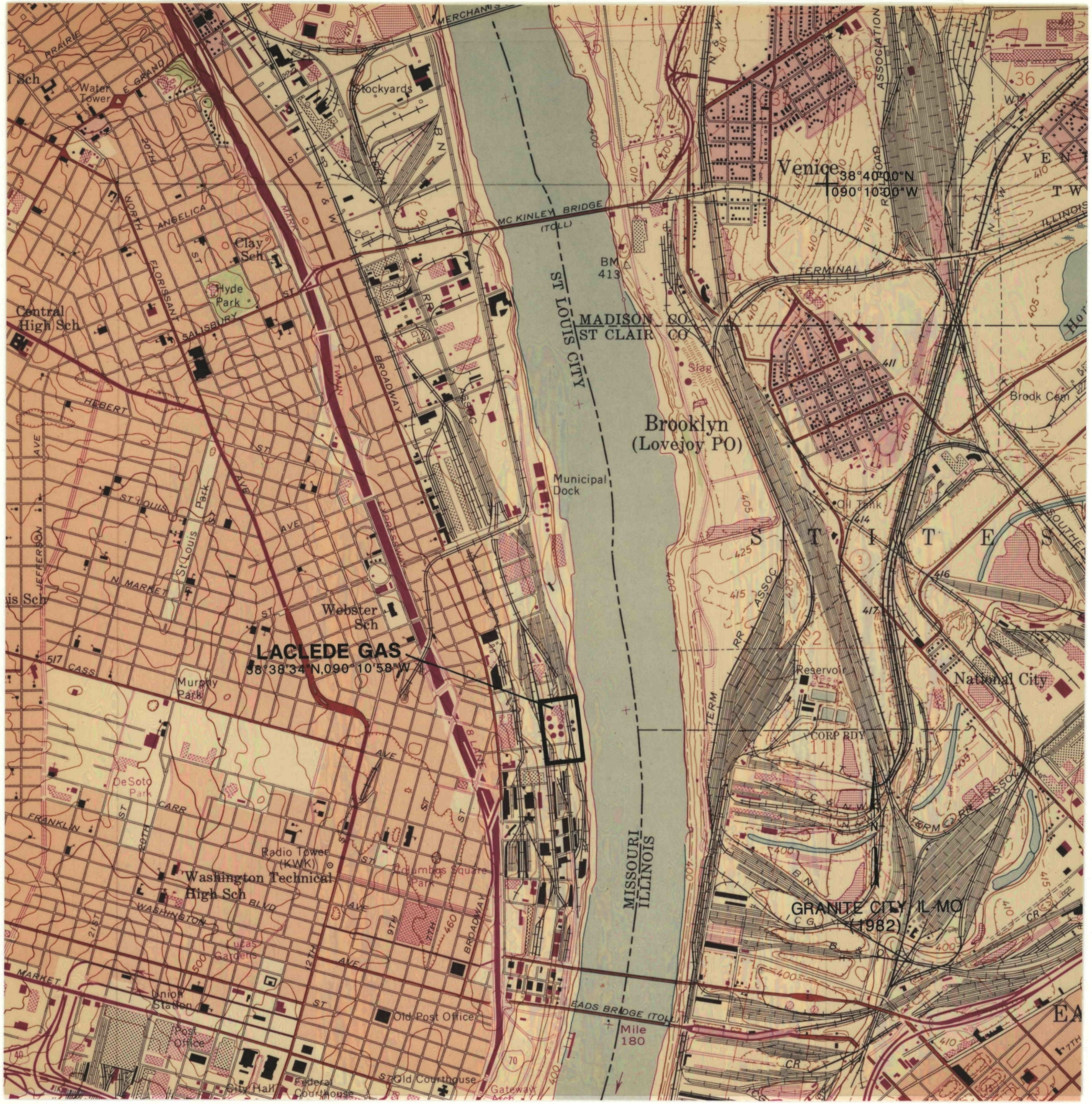


Figure 2. Local study area location map, St. Louis, Missouri. Approximate scale 1:24,000.

ANALYSIS SUMMARY

This report is based on data derived from historical aerial photography of the Laclede Gas Site in St. Louis, Missouri. Image analysis has been completed and presented in chronological sequence to include photography from 1941, 1953, 1958, 1968, 1971, 1974, 1980, 1984, and 1988. There are eight years of black and white photography, and one year (1988) of color infrared photography. Evidence of wetlands was not discernible on the photography analyzed. The site is not susceptible to 100-year floods.

The 1941 photography reveals the site as generally flat, situated on top of a high banked area adjoining the Mississippi River. An electric power plant and coal gasification facility have been located in the northwest portion of the site. Three large inflated gasometers are visible to the immediate north of the coal gasification facility. A suspected burial pit, fill area, and probable liquid stain have been observed in the southern and eastern portions of the site. The 1953, 1958, and 1968 photography shows the dismantling and removal of the coal gasification facility, the three gasometers, and several vertical tanks.

The 1971 photography divulges the emplacement of five vertical petroleum storage tanks. No significant modifications to the site have been observed on the 1974 photography. The 1980 photography reveals the placement of a commercial loading dock and an overhead pipeline extending from the dock into the eastside of the site. A probable liquid stain was observed at the convergence of piping that interconnects the petroleum storage tanks. No significant changes were observed on the 1984 photography. The 1988 color infrared photography revealed zones of vegetation stress on and adjacent to the site.

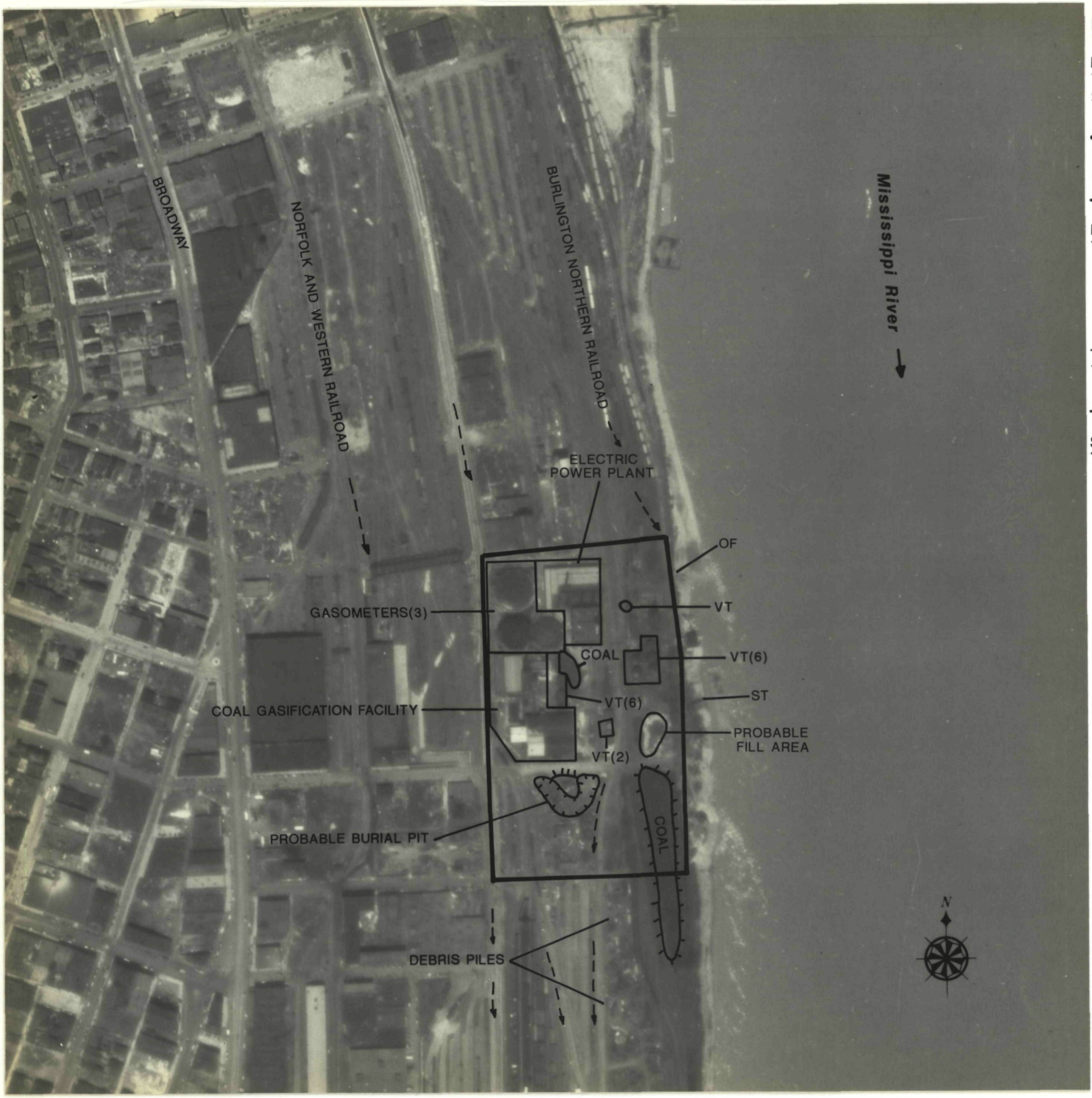
PHOTO ANALYSIS

JULY 17, 1941 (FIGURE 3)

The 1941 photography is the earliest year of photographic coverage acquired. The photography shows the topography at the site as generally flat, situated on top of a high banked area adjoining the Mississippi River. There were no drainages evident on or around the site, except for the Mississippi River which lies to the east.

Two principal features of the analysis, an electric power plant and coal gasification facility, are located in the northwest portion of the site. A conduit discharging liquid (OF) into the river, is probably associated with the electric power plant. The three large gasometers observed to the immediate north of the coal gasification plant are components of the facility. The three gasometers observed, have attained different degrees of height. The height of the individual gasometers are proportional to their gaseous content.

An excavation in the southern portion of the site appears to be a burial pit containing scattered debris. A linear streak extending from the upper to lower portions of the river bank is dark-toned and probably a liquid stain. Above the stain is a fill of unidentified material.



INTERPRETATION CODE

BOUNDARIES AND LIMITS

- FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- FENCE
- STUDY AREA

DRAINAGE

- DRAINAGE
- FLOW DIRECTION
- INDETERMINATE DRAINAGE

TRANSPORTATION/UTILITY

- VEHICLE ACCESS
- RAILWAY

SITE FEATURES

- DIKE
- STANDING LIQUID
- SL STANDING LIQUID
- EXCAVATION, PIT (EXTENSIVE)
- MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
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- DG DISTURBED GROUND
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- LG LAGOON
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- ST STAIN
- SW SOLID WASTE
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- WL WETLAND

Figure 3. Laclede Gas, July 17, 1941. Approximate Scale 1:4,510.

SEPTEMBER 8, 1953 (FIGURE 4)

The 1953 photography shows the partial dismantling of the coal gasification facility. A building in the southeast portion of the facility and two vertical tanks adjacent to the building have been removed.

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Figure 4. Laclede Gas, September 8, 1953. Approximate Scale 1:5,740.

MAY 13, 1958 (FIGURE 5)

This years photography reveals the continued dismantling of the coal gasification facility. The roof in the north-central section of the facility has been removed exposing cubic cells of the infrastructure. The three gasometers appear to be deflated.

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Figure 5. Laclede Gas, May 13, 1958. Approximate Scale 1:5,580.

MARCH 3, 1968 (FIGURE 6)

The 1968 photography reveals significant changes occurred on the site. The coal gasification facility, three gasometers, and four vertical tanks have been removed. The area occupied by the facility has been cleared and earth moving activities appear to be ongoing. A fence has been constructed along the east side of the site. The fence runs parallel to the Mississippi River. The linear debris pile in the southern section of the site has considerably increased in volume.

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Figure 6. Laclede Gas, March 3, 1968. Approximate Scale 1:6,580.

AUGUST 26, 1971 (FIGURE 7)

The 1971 photography shows the emplacement of five vertical petroleum storage tanks in the area previously occupied by the coal gasification facility. The petroleum tanks are contained by a berm and secured by a perimeter fence. A dark toned stain has been observed adjacent to the loading rack immediately north of the storage tanks.

The conduit discharging liquids into the Mississippi River is not evident on this years photography. The operational status of the electric power plant cannot be discerned.

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Figure 7. Laclede Gas, August 26, 1971. Approximate Scale 1:5,580.

JULY 30, 1974 (FIGURE 8)

The 1974 photography reveals no significant alterations to the site.

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Figure 8. Laclede Gas, July 30, 1974. Approximate Scale 1:8,460.

DECEMBER 14, 1980 (FIGURE 9)

The 1980 photography reveals the placement of a commercial loading dock on the Mississippi River directly east of the site. An overhead pipeline positioned on the loading dock, extends east, entering the eastside of the site. A dark-toned stain is identified underneath the piping which interconnects the petroleum storage tanks.

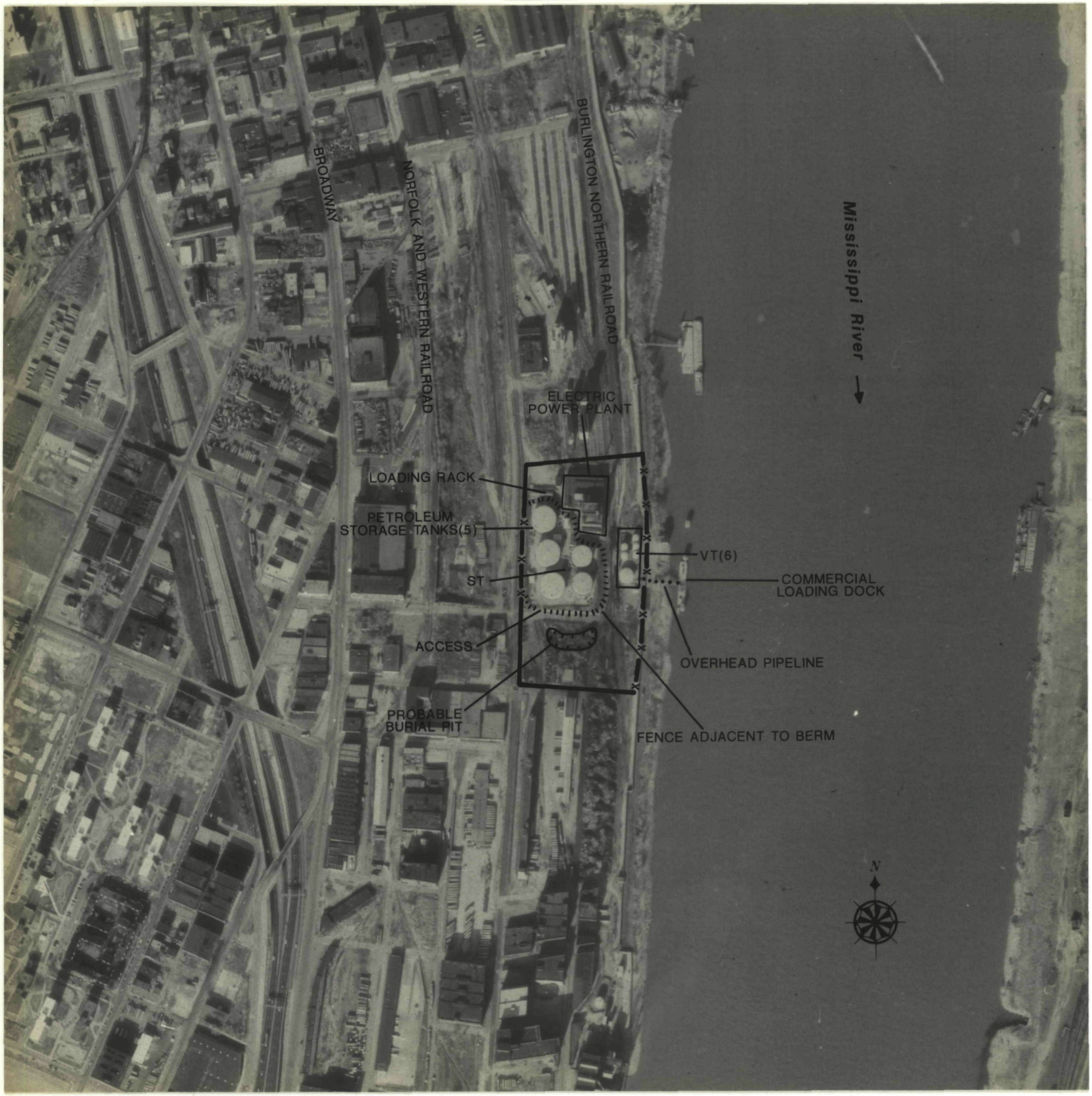

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Figure 9. Laclede Gas, December 14, 1980. Approximate Scale 1:6,530.

FEBRUARY 21, 1984 (FIGURE 10)

No significant changes have been observed on the 1984 photography

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Figure 10. Laclede Gas, February 21, 1984. Approximate Scale 1:6,750.

APRIL 7, 1988

The 1988 color infrared photography is an excellent source for the identification of vegetation stress. Areas of suspected vegetation stress have been observed along the banks of the Mississippi River, in the southern portion of the site, and areas to the immediate north and south of the site.

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Figure 11. Laclede Gas, April 7, 1988. Approximate Scale 1:10,860.